

REMARKS

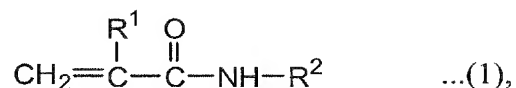
The Official Action of December 13, 2007, and the prior art relied upon therein have been carefully reviewed. The claims in the application are now claims 34-51, and these claims define novel and unobvious subject matter under Sections 102 and 103, and therefore should be allowed. Favorable reconsideration and allowance are therefore respectfully requested.

Acknowledgment by the PTO of the receipt of applicant's papers filed under Section 119 is noted.

Claims 34-36, 37, 39, 40-42 and 49 have been rejected under Section 103 as obvious from Nagan USP 5,393,436 (Nagan). This rejection is respectfully traversed.

Claims 34-36 are directed to the monomer. Claims 37 and 39 are directed to the elastically conductive polymer. Claims 40-42 are directed to a conductive resin containing the electrically conductive polymer. Claim 49 is directed to the method of making the monomer. Applicant addresses these different claims sequentially as follows:

Claim 34 calls for that: "A phosphorus-acid-group-containing (meth)acrylamide comprising (meth)acrylamide represented by the following formula (1):



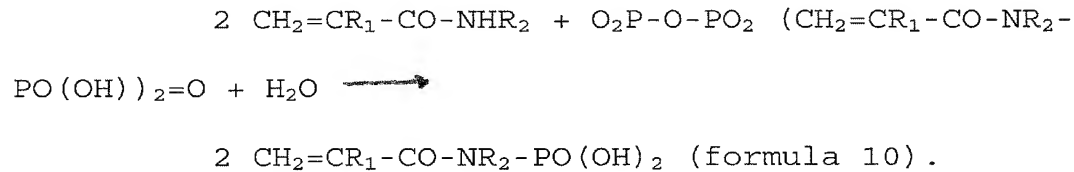
wherein  $\text{R}^1$  is a hydrogen group or a methyl group, and  $\text{R}^2$  is a hydrogen group or a substituted or unsubstituted hydrocarbon group, and a phosphorus acid group directly bonded to a nitrogen atom of an amide group in said (meth)acrylamide monomer."

That is, claim 34 defines, for example, the following compounds:

$\text{CH}_2=\text{CR}_1-\text{CO}-\text{NR}_2-\text{PO}(\text{OH})_2$  (formula 10),  $\text{CH}_2=\text{CR}_1-\text{CO}-\text{NR}_2-(\text{PO}(\text{OH})-\text{O})_n-\text{PO}(\text{OH})_2$  (formula 9),  $\text{CH}_2=\text{CR}_1-\text{CO}-\text{N}(-\text{PO}(\text{OH})_2)_2$  (formula 11).

Thus, compound  $\text{CH}_2=\text{CR}_1-\text{CO}-\text{NR}_2-\text{PO}(\text{OH})_2$  shown by formula 10 can be produced according to the following reaction between a (meth)acrylamide monomer and phosphoric anhydride in an organic solvent such as a solvent containing **no active hydrogen** and/or an acidic solvent (see page 12, lines 2-11 in paragraph [0043], of the present specification) to form an addition intermediate (adduct) thereof, i.e., pyrophosphonic diacrylamide, at a temperature of 50-110°C for 2-10 hours (see page 11, lines 14-25 in paragraph [0042], of the specification), followed by hydrolyzing the adduct at a

temperature of 60-100°C for 15 minutes to 1 hour (see page 12, line 1 in paragraph [0042], of the specification):



The above reaction is explained in detail in paragraphs [0037] and [0038] at pages 8 and 9 of the specification. Therefore, the hydrolysis step in the above reaction sequence is indispensable.

In contrast to the claimed invention, Nagan discloses a method of treating an **aqueous** system, e.g. treating sewage streams as well as aqueous streams in pulp and paper mill processing, which includes the steps of adding a polymeric composition to an aqueous stream, the composition being such an anionically modified acrylamide polymer in an aqueous medium that is formed by reacting an acrylamide polymer with phosphorous acid, and which has at least 5 mole percent phosphonate groups based on the acrylamide content of the polymer, and having a molecular weight of at least about 40,000, the pH of the composition being adjusted to at least about 7.7 (see the Abstract of Nagan).

Specifically, Nagan teaches that the inventive polymers of Nagan are preferably prepared by a reaction in which an aqueous solution of an acrylamide polymer is mixed

with phosphorous acid ( $\text{H}_3\text{PO}_3$ :  $\text{P}(\text{OH})_3$ ), and the reaction takes place essentially **instantaneously** or **within a few seconds** under acidic conditions, preferably at a pH ranging between about 1 and about 2, and at reaction temperatures ranging between about 34°F and about 200°F (about 1°C and about 93°C), features of which are completely different from those of the claimed invention.

Therefore, those skilled in the art referring to Nagan, which teaches merely an anionically modified acrylamide polymer used to treat sewage streams as well as aqueous streams in pulp and paper mill processing, at the time the present invention was made, would not have been able to reach the features of claim 34. Accordingly, claim 34 is not obvious from Nagan.

As best understood, and although not stated explicitly in the rejection, it appears that the rejection at least as regards claims 34-36 relies on assumed inherency. In this regard, the rejection states near the top of page 4 that "Nagan teaches a substantially similar process..., therefore the [resultant] material should reasonably comprise comonomers containing similar amounts of ethylenically unsaturated bonds and one or more (or none) acid groups in the molecule." But as pointed out above, this assumes far too much. Applicant respectfully notes that the burden of establishing a *prima*

*facie* case of obviousness is initially on the PTO; and to properly rely on inherency, the inherency must be reasonably certain. Please see, for example, *In re Rijckaert*, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993), where the court stated:

While the condition described may be an optimal one, it is not "inherent" in Awamoto [the relied upon prior art]. Nor are the means to achieve this optimal condition disclosed by Awamoto, explicitly or implicitly. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient [to establish inherency.]" *In re Oelrich*, ... 212 USPQ 323, 326 (CCPA 1981) (Citations omitted) (*emphasis added*). "That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown." *In re Spormann*, ... 150 USPQ 449, 452 (CCPA 1966). [First bracketed material added; Second bracketed material in the Court's opinion]

Also please see *In re Brink*, 164 USPQ 247, 249, where the court stated, "Absent a showing [by the PTO] of some reasonable certainty of inherency, the rejection... must fail." There is not only **no** reasonable certainty of inherency that Nagan's process will produce applicant's monomer, but it is reasonably certain that it will not produce applicant's monomer for the reasons pointed out above.

And this is so even without considering applicant's monomers of formula (9) and formula (11), which the rejection acknowledges are not taught by Nagan. Accordingly, applicant need not even address the contention set forth in the third paragraph on page 4 of the Office Action. Nevertheless, for

the record, applicant cannot accept what is stated in the third paragraph on page 4 of the Office Action. Nagan does not teach applicant's monomers or how to obtain applicant's monomers, or even that something advantageous could be obtained by doing something different from what is disclosed in Nagan, i.e. doing what applicant did.

Claim 34 define non-obvious subject matter and therefore should be allowed. Claims 35 and 36 depend from and incorporate the subject matter of claim 34, and are therefore patentable for at least the same reasons as claim 34. Withdrawal of the rejection as it applies to claims 34-36 is therefore in order and is respectfully requested.

Claims 37-39 have been amended to place them in better form for US practice by explicitly specifying that the polymer is electrically conductive. Claims 40-44, which already specify that the resin is conductive, have been similarly amended to specify that the polymer is electrically conductive. Support should be clear, as the electric conductivity of the polymer appears throughout applicant's specification, e.g. at paragraph [0006], page 2, line 24; page 60, lines 16-22, paragraph [0260]; examples 17-23 and Table 7 at pages 62-64; and examples 24-30 in Table 8 at pages 66-68.

Claim 37 and the claims dependent thereon thus now make explicit that the polymer has electric conductivity. This is a characteristic of applicant's polymer about which Nagan is silent. Inherency cannot be relied upon because it cannot be considered that any Nagan polymer is necessarily electrically conductive.

It is to be noted that claim 37 specifies that a phosphorous acid group is directly bonded to a nitrogen atom of an amide group in the (meth)acrylamide, thereby making it possible to obtain the phosphorus-acid-group-containing (meth)acrylamide polymer preferably having such a polymerization degree as to have a viscosity of about 3-200 mPa's (cP) as a methanol solution with a solid concentration of 10-25% by mass, and usually exhibiting surface intrinsic resistivity of  $1 \times 10^7 \Omega \text{ cm}$  or less under the conditions of room temperature and RH of 50-75%, presumably because the polymer has a high phosphonic group (see page 31, lines 21-27 in paragraph [0123] of the specification), about all of which Nagan is silent.

Thus, the conductive resin of the present invention comprises the above, electrically conductive, phosphorus-acid-group-containing (meth)acrylamide polymer as an indispensable component, although this conductive resin may contain other resins with which the phosphorus-acid-group-containing

(meth)acrylamide polymer has excellent compatibility. Accordingly, the conductive resin comprising other resins exhibits excellent conductivity because of the phosphorus-acid-group-containing (meth)acrylamide polymer, and excellent film-forming properties, chemical resistance, plasticity, transparency, high adhesion to various substrates, etc. owned by the other resins (see page 32, lines 4-12 in paragraph [0125] of the specification).

Therefore, those skilled in the art referring to Nagan, which teaches merely an anionically modified acrylamide polymer used to treat sewage streams, etc., and fails to teach any phosphorus-acid-group-containing (meth)acrylamide polymer having electric conductivity, would not be able to reach the features of claim 37. Claim 37 would not have been obvious from Nagan.

Accordingly, claim 37 defines non-obvious subject matter over Nagan and should be allowed. As claim 39 depends from and incorporates the subject matter of claim 37, it also defines non-obvious subject matter over Nagan for at least the same reasons as claim 37. Withdrawal of the rejection as regards claims 37 and 39 is therefore in order and is respectfully requested.

Claim 40 calls for a conductive resin comprising the electrically conductive polymer, i.e. the same electrically



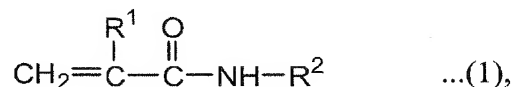
conductive polymer as defined in claim 37. Claims 41 and 42 depend from and incorporate the subject matter of claim 40. Because claims 40-42 call for the presence of the same electrically conductive polymer as recited in claim 37, it follows that claims 40-42 define non-obvious subject matter over Nagan for the same reasons as described above with respect to claim 37.

In this regard, it should be specifically noted that Examples 8 and 9 each comprise a phosphorus-acid-group-containing acrylamide polymer having electric conductivity obtained by polymerizing phosphonic acrylamide and thus show a surface intrinsic resistivity of  $5.28 \times 10^5$  ( $\Omega$  cm) and  $6.34 \times 10^5$  ( $\Omega$  cm) at RH 50%/20°C, respectively (see Examples 8 and 9 in Table 4 at page 52 of the specification); and Examples 10 and 11 each comprise a phosphorus-acid-group-containing acrylamide polymer having electric conductivity obtained by polymerizing N,N-diphosphonic acrylamide and thus show a surface intrinsic resistivity of  $1.01 \times 10^6$  ( $\Omega$  cm) and  $4.36 \times 10^5$  ( $\Omega$  cm) at RH 40%/20°C, respectively (see Examples 10 and 11 in Table 4 at page 52 of the specification).

Withdrawal of the rejection of claims 40-42 is therefore in order and is respectfully requested.

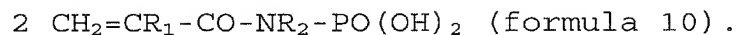
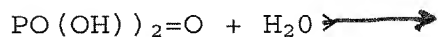
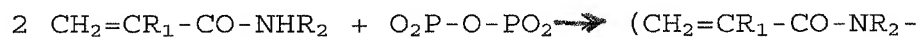
Claim 49 calls for: "A method for producing phosphorus-acid-group-containing (meth)acrylamide, comprising

(a) reacting (meth)acrylamide represented by the following formula (1):

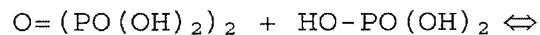
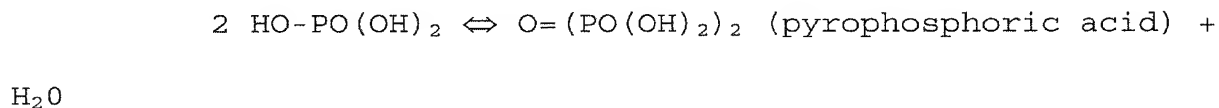


wherein  $\text{R}^1$  is a hydrogen group or a methyl group, and  $\text{R}^2$  is a hydrogen group or a substituted or unsubstituted hydrocarbon group, with phosphoric anhydride and/or phosphorus oxychloride, and hydrolyzing the resultant product, or (b) reacting said (meth)acrylamide with at least one selected from the group consisting of phosphoric acid, pyrophosphoric acid and polyphosphoric acid, **in a solvent containing no active hydrogen and/or an acidic solvent."**

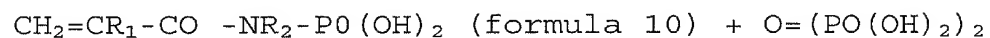
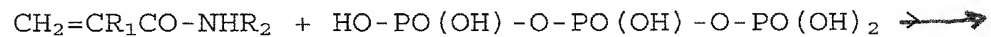
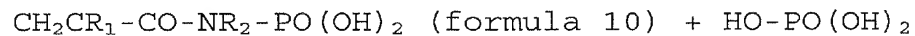
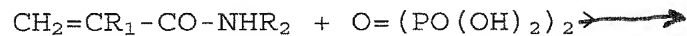
One method (a) of claim 49 above can be shown by the following reaction sequence as described above:



Another method (b) of claim 49 may be shown by the following reaction sequences.



$\text{HO-PO(OH)-O-PO(OH)-O-PO(OH)}_2$  (polyphosphoric acid) +  
 $\text{H}_2\text{O}$



Therefore, those skilled in the art referring to Nagan, which teaches an anionically modified acrylamide polymer as mentioned above, at the time the present invention was made, would not have been able to reach the features of claim 49; and, accordingly, claim 49 would not have been obvious from Nagan.

Withdrawal of the rejection of claim 49 is therefore in order and is respectfully requested.

Claims 38, 43 and 44 have been rejected as obvious under Section 103 from Nagan in view of Osada et al JP 09-324391 (Osada). This rejection is respectfully traversed.

Claim 38 depends from and incorporates the subject matter of claim 37. Claims 43 and 44 depend from and incorporate the subject matter of claim 40. Osada has not been cited to make up for the aforementioned deficiencies of Nagan pointed out above with regard to claims 37 and 40, and indeed does not do so. Therefore, even if the proposed

combination were obvious, respectfully not conceded' by applicant, the resultant reconstruction of Nagan would not reach even claims 37 and 40, let alone dependent claims 38, 43 and 44.

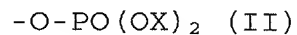
Claim 38 calls for: "The electrically conductive phosphorus-acid-group-containing (meth)acrylamide polymer according to claim 37, comprising as comonomers (a) an unsaturated compound containing one or more ethylenically unsaturated bonds and one or more acid groups in a molecule, and/or (b) an unsaturated compound containing one or more ethylenically unsaturated bonds but no acid group in a molecule."

It has been pointed out above that claim 37 is not obvious from Nagan; and accordingly, claim 38 dependent from claim 37 is also not obvious from Nagan, regardless of the presence of the cited reference Osada,

Nevertheless, applicant would like to add some comments on Osada, which discloses a method for producing a paper or a paperboard which comprises making the paper after adding to the pulp slurry preferably 0.1-1 wt.% (based on the solid portion of a pulp) (meth)acrylamide-based water dispersible high molecular weight material containing a phosphoric acid group of formula I



(X is H, a 1-4C hydrocarbon or an alkali metal) as a paper strength reinforcing agent, wherein the pulp slurry contains 50-5000ppm calcium ion, and further, the (meth)acrylamide-based water dispersible high molecular weight material containing the phosphoric acid group is preferably a water dispersible high molecular weight material consisting of (meth)acrylamide and a monomer containing phosphoric acid group of formula II



(X is H, a 1-6C hydrocarbon or an alkali metal) as main constituting components, and also, pH of the paper making system can be applicable from an acid region to an alkaline region (see Abstract of Osada attached to the Action).

In this regard, Osada teaches mono(2-methacryloxyethyl) acid phosphate (PM)  $(\text{CH}_2=\text{C}(\text{CH}_3)\text{CO}-\text{OCH}_2-\text{CH}_2-\text{O}-\text{PO}(\text{OH})_2$  (see paragraph [0032], line 1, at page 5 of the Machine English Translated Osada). Accordingly, Osada does not disclose and does not teach any comonomer to be copolymerized with the (meth)acryl amide monomer with a phosphorous acid group directly bonded to an amide group thereof as recited in the claim 28 of the present application.

The rejection states at page 6, lines 1-4 of the Office Action that:

"In an analogous art, Osada teaches the acrylamide (meta) system water-dispersion macromolecule comprising monomer having two or more ethylenically unsaturated bonds to provide sufficient paper durability effectiveness ([0018]-[0020])."

However, the subject matter of claim 38 is the phosphorus-acid-group-containing (meth)acrylamide polymer having electric conductivity according to claim 37, which is completely different from the teaching of Osada.

Therefore, those skilled in the art referring to Osada at the time the present invention was made would not be able to achieve the subject matter of claim 38 because Nagan does not teach the phosphorous-acid-group containing (meth)acrylamide material so as to modify it by incorporating a cross-linking monomer containing ethylenically unsaturated bond as suggested by Osada, and, accordingly, the amended claim 38 would not have been obvious from Nagan even though combined with Osada.

Withdrawal of the rejection is in order and is respectfully requested.

Claims 34-37, 39-42 and 49 have been rejected as obvious under Section 103 from Kitani JP 55-025473 (Kitani) in view of Nagan. This rejection is respectfully traversed.

Kitani discloses a polymeric substance obtained by polymerizing (A) acrylic acid which is preferably reacted with an acrylamide N-monosubstituted compound or an acrylamide N,N-disubstituted compound in the presence of (B) a basic salt of phosphoric acid such as tripotassium (potassium tertiary) phosphate, and if necessary, (C) ammonia or ammonium hydroxide for the purpose of preparing a water-insoluble, water-swelling polymeric substance which reversibly absorbs and desorbs water, and useful as an agent for the water-retension, the water and moisture-control in the cultivation of plant, without using a solvent other than water (see Abstract of Kitani attached to the Action).

Specifically, Kitani teaches that an acrylamide N-monosubstituted compound is N-methylolacrylamide, and, a reaction between N-methylolacrylamide and sodium tertiary phosphate ( $\text{Na}_3\text{PO}_4$ ) with ammonium hydroxide followed by polymerizing the resultant reaction product in the presence of a catalyst to obtain a polymeric substance having swelling tendency (see corrected English translation of Example 3 of Kitani enclosed herewith).

In this regard, Kitani teaches that as an N-monosubstituted compound and an N,N-disubstituted compound, N-methylolacrylamide, N,N-dimethylolacrylamide and methylene-bis-acrylamide can be used, and an appropriate addition rate

thereof is 0.1-5 parts by weight, preferably 0.2-5 parts by weight with respect to 100 parts by weight of acrylic acid, whereby as the addition amount of the acrylamide derivative increases in the range above, the elasticity at the time of water absorption swelling of the water swelling polymeric substance shows a tendency to increase, though the water content thereof decreases (see corrected English translation of page 2, left-side upper column. line 13 to right-side upper column, line 2 of Kitani enclosed herewith).

Thus, although Kitani does not discuss about a monomer as the reaction product obtained by the reaction between N-methylolacrylamide and sodium tertiary phosphate ( $\text{Na}_3\text{PO}_4$ ) with ammonium hydroxide, it is clear that this monomer does not have a phosphorus-acid-group directly bonded itself to the amide group of the N-methylolacrylamide.

Accordingly, Kitani does not disclose, teach or suggest any phosphorus-acid-group-containing (meth)acrylamide polymer having electric conductivity as claimed in claim 37 of the present application.

The PTO recognizes that Kitani alone is not sufficient, and therefore relies also on Nagan, described above. However, Nagan does not make up for the aforementioned deficiencies of Kitani for the reasons as pointed out above in applicant's traversal of the rejections based on Nagan. In this regard,



Nagan does not teach the features of claim 34, and also does not teach any phosphorus-acid-group-containing (meth)acrylamide polymer having electric conductivity obtained by polymerizing a phosphorus-acid-group-containing (meth)acrylamide monomer as claimed in claim 34 of the present application.

Therefore, those skilled in the art referring to Kitani and Nagan, at the time the present invention was made, would not have been able to reach the claimed phosphorous-acid-group-containing (meth)acrylamide composition, because Kitani does not teach the (meth)acryl amide monomer with a phosphorous acid group directly bonded to an amide group thereof in view of Nagan in order to provide a polymer having electric conductivity; and, accordingly, claims 34-36, 37, 39, 40-42, and 49 are not obvious from Kitani even if obviously combined with Nagan.

Withdrawal of the rejection is in order and is respectfully requested.

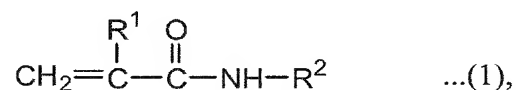
Claims 38, 43 and 44 have been rejected as obvious under Section 103 from Kitani in view of Nagan and further in view of Osada. This rejection is also respectfully traversed.

Applicant's comments made above apply fully to this rejection, and such comments are respectfully repeated by reference. Briefly, Kitani does not teach the (meth)

acrylamide monomer with a phosphorus acid group directly bonded to an amide group thereof. Also as pointed out above, claim 38 would not have been obvious from Nagan even if obviously combinable and combined with Osada.

Therefore, those skilled in the art referring to Kitani, Nagan and Osada at the time the present invention was made would not have reached the subject matter of claim 38 reciting the phosphorus-acid-group-containing (meth)acrylamide polymer having electric conductivity according to claim 37, because Kitani does not teach the (meth)acryl amide monomer with a phosphorous acid group directly bonded to an amide group thereof in view of Nagan in order to provide a polymer having electric conductivity, whereby it is impossible to modify the polymer by incorporating a cross-linking monomer containing ethylenically unsaturated bond as suggested by Osada, and, accordingly, the amended claim 38 is not obvious from Kitani in view of Nagan, and further in view of Osada.

With respect to claim 43, as described above, both Kitani and Nagan fail to teach not only any phosphorus-acid-group-containing (meth)acrylamide comprising (meth)acrylamide represented by the following formula (1):



wherein  $R^1$  is a hydrogen group or a methyl group, and  $R^2$  is a hydrogen group or a substituted or unsubstituted hydrocarbon group, and a phosphorus acid group directly bonded to a nitrogen atom of an amide group in the (meth)acrylamide monomer, but also any phosphorus-acid-group-containing (meth)acrylamide polymer having electric conductivity obtained by polymerizing a phosphorus-acid-group-containing (meth)acrylamide monomer (1).

Also, as described above, Osada teaches a (meth)acrylamide-based water dispersible high molecular weight material containing a phosphoric acid group as a paper strength reinforcing agent, but does not teach any conductive resin comprising a phosphorus-acid-group-containing (meth)acrylamide polymer having electric conductivity, which is obtained by polymerizing the phosphorus-acid-group-containing (meth)acrylamide monomer comprising (meth)acrylamide represented by the above formula (1) mentioned above as called for in claim 40 of the present application.

Therefore, those skilled in the art referring to Kitani, Nagan and Osada at the time the present invention was made would not have reached the subject matter of claim 43 reciting:

"The conductive resin according to claim 40,  
wherein said phosphorus-acid-group-containing

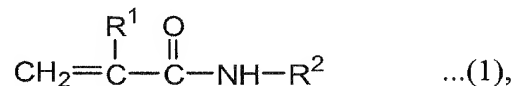
(meth)acrylamide polymer comprises as comonomers (a) an unsaturated compound containing one or more ethylenically unsaturated bonds and one or more acid groups in a molecule, and/or (b) an unsaturated compound containing one or more ethylenically unsaturated bonds but no acid group in a molecule."

because Kitani fails to teach the (meth)acryl amide monomer with a phosphorous acid group directly bonded to an amide group thereof in view of Nagan in order to provide a polymer having electric conductivity, about which Nagan is silent, so as to modify the phosphorous-acid-group containing (meth)acrylamide material of Nagan by incorporating a cross-linking monomer containing ethylenically unsaturated bond as suggested by Osada, and, accordingly, the subject matter of claim 43 is not obvious from Kitani in view of Nagan, and further in view of Osada.

Withdrawal of the rejection is in order and is respectfully requested.

Claims 44 and 46 have been rejected as obvious under section 103 from Kitani in view of Nagan and further in view of Abe et al JP 2003-257237 (Abe). This rejection is respectfully traversed.

Claim 45 calls for: "A polymer electrolyte membrane comprising a polymer of a phosphorus-acid-group-containing (meth)acrylamide monomer, which comprises (meth)acrylamide represented by the following formula (1):

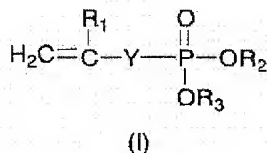


wherein  $\text{R}^1$  is a hydrogen group or a methyl group, and  $\text{R}^2$  is a hydrogen group or a substituted or unsubstituted hydrocarbon group, and a phosphorus acid group directly bonded to a nitrogen atom of an amide group in said (meth)acrylamide, wherein said membrane is electrically conductive."

As described above, both Kitani and Nagan fail to teach not only any phosphorus-acid-group-containing (meth)acrylamide monomer comprising (meth)acrylamide but also any phosphorus-acid-group-containing (meth)acrylamide polymer having electric conductivity obtained by polymerizing the phosphorus-acid-group-containing (meth)acrylamide monomer.

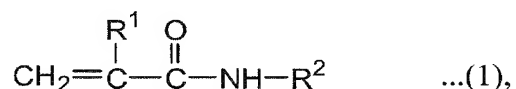
Abe disclose a proton conduction membrane that carries a polymer having a phosphonic acid group at a side chain in the pores of the porous membrane, obtained by polymerizing a monomer having a phosphonate group in the pores of the porous membrane, and a polymer having a phosphonate group at the side chain is formed and then the above phosphonate group of this polymer is hydrolyzed; thereby, the polymer having the free phosphonic acid group is carried in the pores of the above porous membrane and a proton conduction membrane is provided (see Abstract of Abe attached to the Action).

In this regard, it should be emphasized that the monomer having a phosphonate group to be polymerized in the pores of the porous membrane is represented by the following formula (I):



wherein  $\text{R}_1$  represents H atom or a methyl group,  $\text{R}_2$  and  $\text{R}_3$  represent independently an alkyl group, an aryl group or an arylated alkyl group, respectively, and Y represents an divalent organic group, both ends of a basis of which are **carbon atoms** (see paragraphs [0025] and [0026] of Abe attached to the Action).

That is, Abe does not disclose, teach or suggest a phosphorus-acid-group-containing (meth)acrylamide monomer, which comprises (meth)acrylamide represented by the following formula (1):



wherein  $\text{R}^1$  is a hydrogen group or a methyl group, and  $\text{R}^2$  is a hydrogen group or a substituted or unsubstituted hydrocarbon group, and a phosphorus acid group directly bonded to a nitrogen atom of an amide group in the (meth)acrylamide as recited in claim 34 of the present application.

Therefore, those skilled in the art referring to Kitani, Nagan and Abe at the time the present invention was made would not have been able to reach the subject matter of claim 45, because Kitani does not teach the (meth)acryl amide monomer with a phosphorous acid group directly bonded to an amide group thereof in view of Nagan in order to provide a polymer of a phosphorus acid group-containing (meth)acrylamide monomer, about which Kitani and Nagan are silent so as to achieve an electrolyte membrane having electric conductivity made of such a polymer, about which Abe is silent, and, accordingly, the subject matter of claim 45 is not obvious over Kitani in view of Nagan, and further in view of Abe.

Because claim 46 is dependent from claim 45, it is also not obvious from Kitani, Nagan and Osada in combination thereof.

In this regard, it should be noted that Examples 27 and 28, for instance, in Table 8 of the present specification explain the features of claim 46 of the present application, thereby obtaining the polymer electrolyte membranes exhibiting surface intrinsic resistivity of  $1.42 \times 10^5$  and  $1.35 \times 10^5 \Omega \text{ cm}$  at RH 60% and 15°C and the proton conductivity of the polymer electrolyte membranes being on the level of  $10^{-3}$ - $10^{-2} \text{ S cm}^{-1}$  under the conditions of a temperature of 35-80°C and a relative humidity of 90%, respectively, which are good for

polymer electrolytes having phosphorus acid groups as electrolytic groups (see page 69, lines 1-7 in paragraph [0276] of the specification).

This rejection should be withdrawn, and such is respectfully requested.

Claims 47 and 48 have been rejected as obvious under Section 103 from Kitani in view of Nagan, Abe and Osada. This rejection is respectfully traversed.

Claim 47 calls for: "The polymer electrolyte, electrically conductive membrane according to claim 45, wherein said polymer comprises as co-monomers (a) an unsaturated compound containing one or more ethylenically unsaturated bonds and one or more acid groups in a molecule, and/or (b) an unsaturated compound containing one or more ethylenically unsaturated bonds but no acid group in a molecule."

It has been clarified above that the amended claim 45 is not obvious over Kitani in view of Nagan, and further in view of Abe. Because claim 47 is dependent from claim 45, it is also not obvious from Kitani in view of Nagan, and further in view of Abe, regardless of the presence of cited reference Osada. Nevertheless, applicant would like to add some comments on Osada.



The rejection states at page 10, lines 1-3 of the Office Action that:

"Osada teaches the acrylamide (meta) system water-dispersion macromolecule comprising a cross-linking monomer having two or more ethylenically unsaturated bonds to provide sufficient durability effectiveness ([0018]-[0020])."

However, the subject matter of claim 47 is the polymer electrolyte membrane which has electric conductivity made of a polymer of a phosphorus-acid-group-containing (meth)acrylamide monomer according to claim 45, which is completely different the teaching of Osada.

Therefore, those skilled in the art referring to Kitani, Nagan, Abe and Osada at the time the present invention was made would not be able to reach the subject matter of claim 47, because Kitani does not to teach the (meth)acrylamide monomer with a phosphorous acid group directly bonded to an amide group thereof in view of Nagan in order to provide a polymer of a phosphorus-acid-group-containing (meth)acrylamide monomer, about which Kitani and Nagan are silent, so as to achieve an electrolyte membrane having electric conductivity made of such a polymer, about which Abe is silent, whereby it is impossible to modify the polymer by incorporating a cross-linking monomer containing ethylenically unsaturated bond as suggested by Osada and, accordingly, the subject matter of

claim 47 would not have been obvious from Kitani in view of Nagan, further in view of Abe, and further in view of Osada.

Claim 48 depends from and incorporates the subject matter of claim 47, and is therefore patentable for at least the same reasons as claim 47. Withdrawal of the rejection is in order and is respectfully requested.

New claims 50 and 51 are patentable at least for the reasons that they depend from and incorporate the subject matter respectively of claims 45 and 46. Claim 50 finds support at page 69, lines 1-7 in paragraph [0276] and in examples 17-20 in Table 7 of the specification. Claim 51 finds support at page 69, lines 1-7, again in paragraph [0276] and also in examples 24-30 in Table 8 of applicant's specification.

The prior art documents of record and not relied upon by the PTO have been noted, along with the implication that such documents are deemed by the PTO to be insufficiently material to warrant their application against any of applicants claims.

No rejections have been imposed under Section 112, whereby applicant understands that the claims meet all the requirements of Section 112, and applicant is proceeding in reliance thereof.

Appln. No. 10/590,569  
Amd. dated March 13, 2008  
Reply to Office Action dated: December 13, 2007

Applicant believes that all issues raised in the Official Action have been addressed above in a manner that should lead to patentability of the present application. Favorable consideration and early formal allowance are respectfully requested.

Respectfully submitted,

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